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ABSTRACT

The purpose of this investigation was to develop and test an experimental strategy for the modification of socialization practices, which were hypothesized to affect the development of intellectual skills in young children. Experimental and control groups for this experiment were randomly selected from the population of first grade students in a public school. Pre- and post-testing for each group included three conditions: baseline, imitation, and generalization. The mothers attended five training sessions in small groups of five or fewer. It is concluded that there may be little point in training parents to exercise skills which social conditions preclude them from using. (DB)

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INTELLECTUAL SKILL LEARNING IN THE HOME ENVIRONMENT:

An Interim Research Report

By Ronald W. Henderson

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INTELLECTUAL SKILL LEARNING IN THE HOME ENVIRONMENT:

An Interim Research Report

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Every human culture provides some system for training children to assume their eventual roles as adults in their society. In societies with simple technologies, provisions for instruction can be uncomplicated, with many adults in the community assuming some responsibility for the enculturation of the child. The child is in regular contact with people who are doing the work of the community, and the child learns the functions which are expected of people in his community by observing the behavior of skilled adults and by imitating their behavior. In less complex societies children also have regular opportunities to observe the kinds of satisfactions, or reinforcing events, which are available to those who perform the work of the community. By an early age the child in such a society has had the opportunity to observe most of the roles functioning within his community, and he soon learns to perform tasks which have a real value to others.

As societies become technologically complex, as Western society has, more and more of the responsibility for child training (education) is given over to specialized professional groups. In technologically based cultures there is a strict separation between work roles and family roles which does not exist in technologically simpler cultures.

This shift in responsibility for education from the family and the community at large to professional educators is consistent with parallel increases in the division of labor in other societal functions, and the reasons for the shift are readily apparent. It would appear to be a common sense observation that in societies in which the demand for technical competencies are minimal, most of the skills required for full participation in the society may be learned from parents, artisans, and others, through the highly effective learning strategies of observation and imitation. In contrast, it is equally evident that the skills and attitudes required for participation in our highly technical and ever changing society cannot be learned in this manner. In spite of wide spread criticism of the American public educational system, our society places great faith in the efficacy of formal education as a means of preparing children with the skills they will need to function effectively as adults. Both our technological triumphs and our social ills are commonly attributed to education.

There is now good reason, however, to believe that we have gone too far in our emphasis upon a form of education which is conducted in social institutions which have been designed to educate children in an environment that is functionally isolated from the influences of the family.

Since the home does not generally teach the technical and intellectual skills required in the culture, it has been assumed that the schools do provide an appropriate institution for teaching these skills. This may be generally true, but in making this assumption, the schools have paid little specific attention to the ways in which the home supports the child's learning of such skills. It is now clear that the home environment contributes more to the variance in academic performance than does the quality of the

school program (Coleman, 1966). Gray (1969) has noted that those programs which have produced more durable changes in the performance of children in compensatory preschool programs are those which have simultaneously focused their efforts upon quality educational experiences for children in preschool, and upon helping the parents to become more effective agents of socialization. In reporting on a follow up study of children from her Early Training Project, Gray (1971) reports a qualified "yes" to an initial question regarding whether or not it would be possible to prevent the progressive educational retardation typical of the population of children with whom she worked. She concluded that the schools cannot be blamed entirely for the failure to prevent progressive retardation. In her words, "Unless the home circumstances of the child can be changed, the adverse environment which created the original problem will continue to take its toll" (p. 13).

The results of these applied studies are consistent with the implications of Hunt's (1961) and Bloom's (1964) syntheses of data which suggest that a child's intellectual performance is affected by early experiences in his family and other institutions of the culture. On the basis of such evidence a large number of preschool programs now include a component designed to help parents to provide more effective home learning environments for their children (e.g., Gordon, 1969; Weikart, 1967). Some programs provide the parent with concrete instructional materials which are designed to parallel the instructional content which children experience in the preschool classroom. Others provide training in the use of positive reinforcement for the management of child behavior. Others provide procedures and materials for the teaching of basic cognitive processes, while still other programs work with some combination of these elements.

While such programs are already proceeding on the basis of available data, an important question which whould underlie the selection procedures and content for parent eduction programs is "What are the home characteristics which contribute to the developmnet and maintenance of basic intellectual skills which are important in a technological culture in which the specific intellectual requirements for participation in tomorrow's world can only be guessed at?" The knowledge base relating to this question is yet in a primitive stage of development. In general, attempts to measure the environments in which children are socialized have been limited to the use of gross measures of socioeconomic status (e.g., Miner, 1957) or to the use of global variables such as maternal warmth (Sears, Maccoby, & Levin, 1957). These investigations yield information which is extremely limited in its utility for psychologists and members of other helping professions which are users of psychological knowledge,because the variables are undifferentiated and cannot provide very clear directions regarding the specific aspects of environmental backgrounds which might be modified to provide better experiential support for the development of children's intellectual competencies (Henderson, 1970). Any careful survey of the literature on socialization practices would persuade one to agree with Inkles' (1968) assertion that socialization research has done little to study the acquisition of motives, skills, and other behaviors which are essential to adequate social functioning.

A few investigators have begun to bridge this gap in our knowldege about the relationships between intellectual skill development and experiential factors. Davé and Wolf postulated a set of environmental process variables on the basis of theoretical and empirical literature relating to

child learning and development. They found substantial levels of association between the postulated variables and achievement (Davé, 1963) and intelligence (Wolf, 1964).

Investigations building upon the work of Davé and Wolf (Henderson, 1966; Henderson & Merritt, 1968) have demonstrated that the kinds of environmental variables identified by these investigators are also capable of discriminating sharply between the families of disadvantaged Mexican-American children who perform relatively well or poorly on intellectual measures, and that for these same children, the environmental measures predict achievement rather well over extended periods of time (Henderson, 1969). These latter investigations have identified concurrent and predictive relationships between performance on intellectual measures and environmental measures relating to achievement press, language models, academic guidance, activeness of family, intellecutality in the home, work habits in the family, identification with models, range of social interaction, and perception of practical value of education.

While this work has had practical theoretical and empirical implications relating to the design of parent training programs (Henderson, 1970), and Davé and Wolf environmental measures and the Arizona adaptation of them have several limitations which make them impractical for application on the broad basis which would make it possible to identify the range of environmental differences and similarities across ethnic groups or across socioeconomic status when ethnicity is held constant. The measures require the use of highly skilled interviewers, and the interviews and rating procedures required to quantify the results are time consuming and expensive.

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Researchers at the Arizona Center for Early Childhood Education have been attempting to develop an alternative approach to the measurement of

such variables and have devised a procedure which uses a simplified interview format which can be administered by a trained paraprofessional, and which elicits a mode of response which requires little inference on the part of the respondent, and which can be directly and objectively scored. Certainly this procedure yields records which are not nearly so rich as the protocols resulting from the earlier procedures. At this point, however, it does appear that the data produced through the new procedures do discriminate differences in the environments of families from different groups.

The variables measured by the new instrument, the Henderson Environmental Learning Process Scale (HELPS), are aspiration level, environmental stimulation, models, guidance, and reinforcement. So far we have collected data on the home environments of lower SES first grade Mexican-American children and middle SES Anglo first grade children, while data are currently being collected on the home environments of lower SES Anglo and middle SES Mexican-American children. Descriptive statistics for the data already collected are presented in table 1 and in figures 1 through 6.

Insert table 1 about here

Insert figures 1 through 6 about here

These data must be interpreted with caution, but the consistent pattern revealed here suggests that the instrument does discriminate between home environments, both within and between groups. It remains to be seen whether or not these measures are predictive of intellectual skill performance.

Since the measures do discriminate, when used with these samples, and since the scales are relatively reliable, as indicated by the Cronbach Alpha coefficients presented in table 2, this seems to be a profitable avenue to pursue in our attempts to develop a better understanding of the nature of home environmental variables which contributed to the development of intellectual skills.

Insert table 2 about here

This line of research, together with other approaches such as the Schoggen's (1971) attempts to identify environmental force units in the home environments of children, may be important avenues to extending our knowledge base relating to the conditions which facilitate the child's development of intellectual skills. But descriptive and correlational studies can only suggest hypotheses concerning antecedent-consequent relationships between children's early experiences and their intellectual skill performance. Consequently, as the research reported above proceeds, hypotheses regarding parental skills which may affect the child's development have stimulated experimental investigations which are designed to study these relationships.

One such investigation was designed to determine the efficacy of direct training to provide parents with skills which may be hypothesized to influence the development of the intellectual skill of question-asking. The purpose of this investigation was to develop and test an experimental strategy for the modification of socialization practices which were hypothesized to affect the development of intellectual skills in young children. The

data now available which demonstrate relationships between a child's school performance and the kinds of experiences provided in the home environment suggest a crucial need to isolate and attempt to modify selected aspects of the socialization practices of parents of disadvantaged children. It is assumed that, since there is overlap between the targeted groups with regard to the socialization practices for which training will be provided in this experiment, the danger of intruding into the value system of any particular group is minimized.

The specific focus of this investigation resulted from serendipitious findings of Rosenthal and Zimmerman during a pilot study for one of their earlier experiments (1970). They found that adult modeling of question-asking skills which were effective with young middle class Anglo pupils did not elicit question-asking from young lower SES Mexican-American children of comparable age. This finding, coupled with informal classroom observations which suggested that young Mexican-American pupils engage in a very low rate of question-asking influenced us to focus on the intellectual skill of question-asking. We have assumed that question-asking is a basic intellectual skill by which a child can elicit information from his environment and teach himself, and that it may therefore be of great importance to develop procedures to help parents to develop skills to facilitate the development of this behavior in their children. If there is, in fact, a higher frequency of this behavior in the repertoire of middle class populations, this may in part account for the cumulative discrepancy in school performance between middle and lower socioeconomic status groups, and between more and less successful learners within these groups.

Experimental and control groups for this experiment were randomly

selected from the population of first grade students in a public school in Tucson, Arizona. Data are only partially analyzed, but it is possible to report here on that portion of the analysis which has been completed for this phase of the study.

Pre- and post-testing for each group included three conditions; baseline, imitation, and generalization. In each condition, stimulus cards were used to elicit questioning form the subjects, who were tested one at a time. The stimulus cards consisted of 11" x 6" cards depicting inanimate objects. The cards were bound in a loose-leaf notebook, and the order of presentation alternated colored with achromatic pictures. The same set of cards was used in the baseline and imitation conditions. A set of 12 different cards was used in the generalization phase.

Baseline Condition: Children who were subjects in the study met with the experimenter individually. Following rapport building activities, the sujbect was told that he and the experimenter would play a game, and that if the child played the game well, he would get a surprise at the end of the game. At this point the experimenter pointed to a box of sugar coated cereal which was present in the experimental room. The subject was told that his part in the game would be to ask questions. Instructions were given to assure that the subject understood what a question was without modeling any question category. The subject was then instructed to ask a question about each stimulus card as it was presented. If a child made a declarative statement about a card he was prompted to ask a question. In instances in which no response at all was given during the first 15 seconds following presentation of a stimulus card, a prompt was given. Only one prompt was given per card, and if the subject made no response during

a 15 second interval following the prompt, the experimenter turned to the next card. A third person sat unobtrusively in the experimental room to code the child's responses, thus freeing the experimenter to devote all of his attention to the child. The child's responses were coded into one of four categories: causal questions, non-causal questions, conversation (i.e., non-question verbalizations), and silence.

Imitation Condition: Following the recording of data for the baseline condition, a second set of procedures was instituted to set up conditions in which the child's imitative responding to question-asking modeled by the experimenter could be measured. The experimenter indicated to the subject child that he, the experimenter, would now have a turn at asking questions about the pictures. The subject was told, "You won't have to answer, but just listen carefully to the questions I ask, and later you'll have a chance to ask some questions. Okay?"

The experimenter then presented the same stimulus cards one at a time, in full view of the sujbect, and asked causal questions about each card. Questions such as the following were modeled: To a picture of a typewriter, "When does the bell on the typewriter ring?", or to the picture of a balloon, "What would happen if you stuck it with a pin?"

Following the modeling procedures, the experimenter told the subject, "Okay, now its <u>your</u> turn to ask some questions. Now ask me something you want to know about this picture." Procedures duing this phase of the imitation condition followed the steps described for the baseline condition discussed above.

Generalization Condition.: Immediately following the presentation of stimulus cards 1 through 12 in the modeling sequence of the imitation con-

dition, the experimenter proceeded on with cards 13 through 24, which constituted the stimulus materials for the generalization condition of the experiment.

Upon completion of the twenty-fourth card, each subject was praised for his participation, and was allowed to help himself to the sugar coated cereal, regardless of the nature of his performance during the session.

Following the collection of pre-treatment data just described, the mothers of children in the experimental group participated in a training program, the objectives of which were to increase the frequency of question-asking in their child who was a subject in the experimental group, and to raise the order of his question-asking from nominal-physical questions (e.g., "What is this?", "What color is it?", "What is it made of?"), to causal questions (e.g., "Why?", or "How come?"). The procedures of modeling, cueing, and reinforcement were taught to the mothers as a means of facilitating this change in the questioning behavior in their child. A manual describing the training procedures in detail is now in preparation. In brief, mothers attended five training sessions in small groups of five or fewer participants. After disucssion of the rationale for the experiment in general and the training program in specific, mothers viewed demonstrations and learned to code question-asking behaivor in the demonstration setting. They observed role playing in which staff members modeled parent and child behavior, and then engaged in role playing themselves, alternately taking the role of the child and then the parent in interaction with a member of the staff. Following each training session and before attending the next of each set of training meetings, each mother spent at least two ten minute periods with her child, attempting to apply the procedures learned during

training, and recording data on the questions asked by their child. After the initial sessions, mothers were asked to reinforce all questions with praise and attention, but to model only causal questions. The mothers were paid $1.50 per hour for each training session attended to offset the expense of a baby sitter or other arrangements necessary to free the mother to attend the training.

In instances where mothers had to absent themselves from a training session, makeup training was done in the home of the subject child. Makeup was important becuase the skills taught in the training sessions were structured sequentially. By the time the five training sessions were completed, each mother had spent at least ten practice sessions with her child.

Post-testing with the stimulus cards was conducted at the end of the training period to identify changes in children's question-asking which might be attributable to training effects. Post-testing for this part of the study included the same conditions (haseline, imitation, and generalization) and procedures as described for the pre-test phase. Descriptive statistics have been computed for these data are presented in figures 7 and 8.

Insert figure 7 about here

Figure 7 presents combined data for causal and non-causal questions for the pre- and post-testing with the stimulus cards. These data indicate that the rate of question-asking was very low for the baseline condition, for both the experimental and control group. Question-asking increased for both groups during the imitation and generalization conditions.

Following the training of mothers of children in the experimental group, the mean baseline rate for controls was 1.50 and 5.63 for the experimental group. This represents more than a five fold increase for the experimental group under the baseline condition. Under the imitation condition, both groups increased over the pre-test rate, with experimentals asking an average of 8.53 questions and controls an average of 4.83 questions out of a total of 12 possible. These changes were maintained for both groups under the generalization condition, with controls asking an average of 4.38 questions, and experimentals asking an average of 8.21 questions. The magnitude of the differences between experimental and control groups and the consistency of the direction of the differences indicate that the training program provided an effective means of affecting the child's behavior through the procedures learned by the mothers. The fact that the question-asking behavior generalized to an unfamiliar set of stimulus materials presented by unfamiliar adults also indicates that the question-asking skills learned by children in this experiment may have horizontal transfer properties.

Figure 8 presents a more detailed breakdown of the same data. Here data on the production of causal and non-causal questions are presented separately. The general pattern of differences between the experimental and control groups, as described above, follows for these data also. To that pattern the data presented in figure 8 adds the information that children were able to discriminate the causal category of questioning which was modeled for them, and that they were able to increase the level of their own questioning in this category after exposure to the modeling. Since further increases in the rate of causal questioning were evident for the experimental group (a change from 6.1 to 7.2 from pre- to post-imitation, and from 4.91

to 7.42 for generalization for the experimental group, compared to a decrement from 5.6 to 3.79 for imitation and from 4.82 to 3.29 for generalization for the control group) it also seems clear that the mothers' activities in working with their own children had a facilitating influence on the performance of the experimental children. It should be remembered that in their sessions with their children, the mothers modeled causal questions.

Insert figure 8 about here

Further analysis of data from this program of research on environmental influences should provide us with additional knowledge regarding procedures which may be helpful in training parents to exercise socialization practices which will facilitate the development of intellectual skills in their children. Pre- and post- mother-child interaction data which were collected should help to identify more specifically the ways in which the training procedures affected the ways in which mothers interacted with their children. These data are now being coded and should soon be analyzed. We recognize that it would be naive to think that this training will automatically generalize and help mothers to work more effectively with their children on other intellecutal skills, or behaviors which might facilitate the development of other intellectual skills. We have already taken steps to help mothers to generalize these skills by taking them with their children to a variety of settings in which they might practice their new skills in unfamiliar contexts, such as the library or the zoo. But even if these procedures prove effective, there remains the important question of how these practices can be extended and maintained once the influence of the training staff is withdrawn.

This consideration brings us back to the social structure issues raised in the introduction to this paper. Even if we were successful in identifying the kinds of environmental variables which facilitate the early development of intellectual skills in young children, and if we were remarkably clever in our programs to provide parents with socialization skills which would produce such environments for children, we would still be faced with the problem of affecting the total social context of the family in a way that would free parents to utilize their skills. One year ago, at a meeting of this oranization, Brofenbrenner (1971) said,

> In today's world, parents find themselves at the mercy of a society which imposes pressures and priorities that allow neither time nor place for meaningful activities and relations between children and adults, which down grade the role of parent and the functions of parenthood, and which prevent the parent from doing the things he wants to do... (p. 158)

Brofenbrenner went on to say that

> The frustrations are greatest for the family of poverty, where the capacity for human response is crippled by hunger, cold, filth, sickness and despair. No parent who spends his days in search of menial work and his nights in keeping rats away from the crib can be expected to find the time let alone the heart, to engage in constructive activities with his children, or serve as a stable source of love and discipline. The fact that some families in poverty do manage to do this is a tribute to them, but not to the society or the community in which they live. (p. 158)

As we worked with the mothers who participated earnestly and enthusastically in our experiment, the truth of Brofenbrenner's words came home forcefully to us. The health problems and personal calamities which beset these families who wanted desperately to improve their lot and the future prospects for their children made a more profound impression on us than did our data on training effects. Yet during the year since Brofenbrenner's speech to this group we have seen no visible evidence that there is much

hope of improving the quality of life in this nation, or have we seen very encouraging signs that our country has the moral and intellectual leadership to provide the conditions which would free framilies to make their rightful contributions to the growth and development of their children. Even the recent day care legislation, if shortsightedly handled, could aggravate more than help the social conditions in which we live.

There may be little point in training parents to exercise skills which social conditions preclude them from using. Psychological principles, such as those used in our training program, hold the potential of providing powerful tools for facilitating the development of intellectual skills and other competencies which are critical to productive functioning in a culture which is heavily influenced by science and technology. But without sweeping social reforms, that potential seems most unlikely to be realized.

Footnote

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TABLE 1

DESCRIPTIVE STATISTICS ON ENVIRONMENTAL MEASURES

	Aspiration Level		Environmental Stimulation		Models		Guidance		Reinforcement		Total	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Mexican-American*	32.4	4.6	48.8	8.7	42.2	7.3	40.6	7.2	21.7	3.3	185.7	22.0
Anglo**	33.7	3.9	60.5	6.9	53.6	6.9	44.6	6.7	22.4	2.3	214.8	18.0

*N = 60
**N = 66

TABLE 2

RELIABILITY DATA FOR ENVIRONMENTAL MEASURES SCALE

		Aspiration Level	Environmental Stimulation	Models	Guidance	Reinforcement	Total
Cronbac Alpha	Mexican-Americans*	.56	.59	.56	.62	.65	.81
	Anglo**	.47	.66	.70	.76	.45	.83

*N = 60
**N = 66

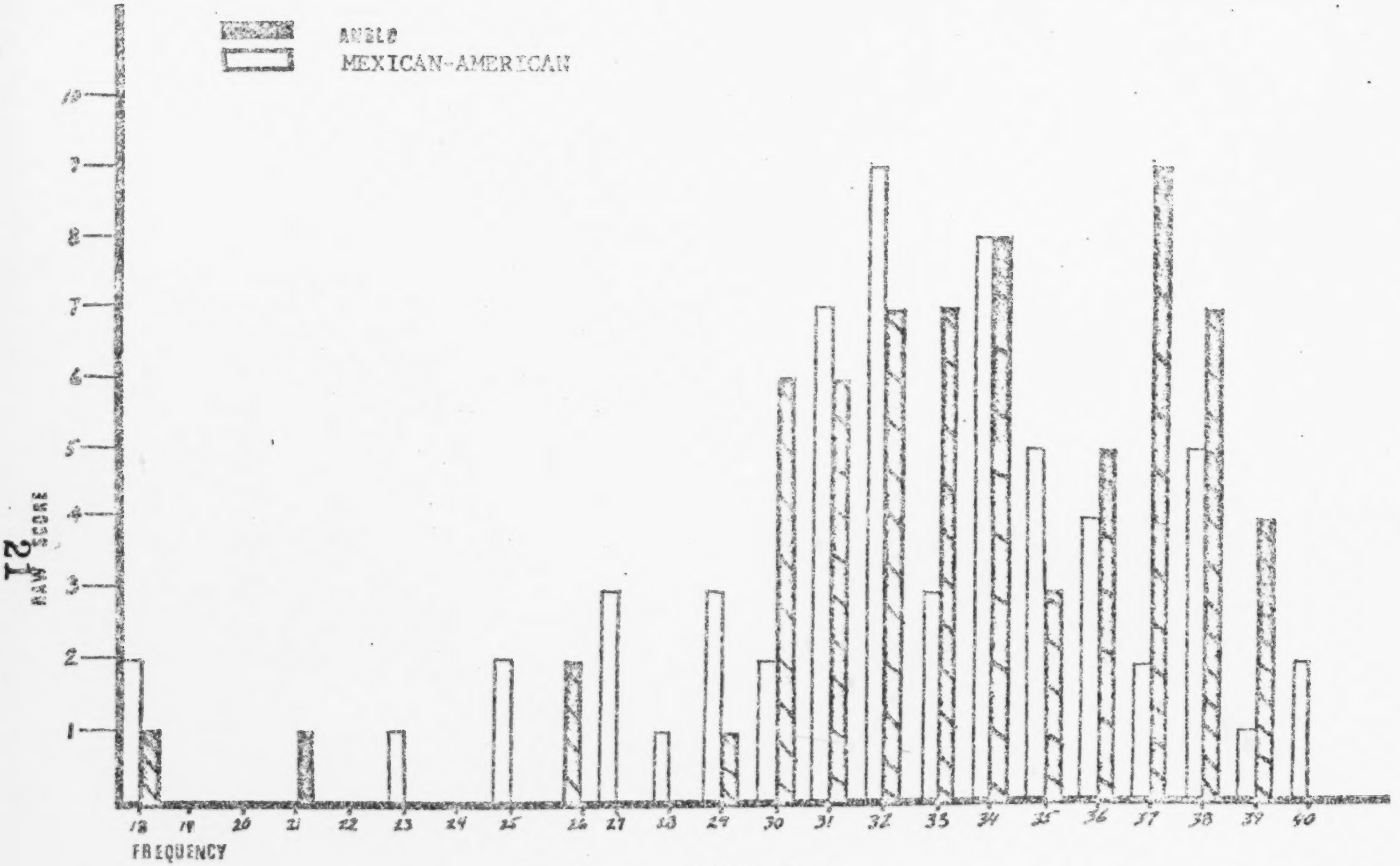

FIGURE 1

RAW SCORE DISTRIBUTION FOR ASPIRATION LEVEL SCALE ON HELPS

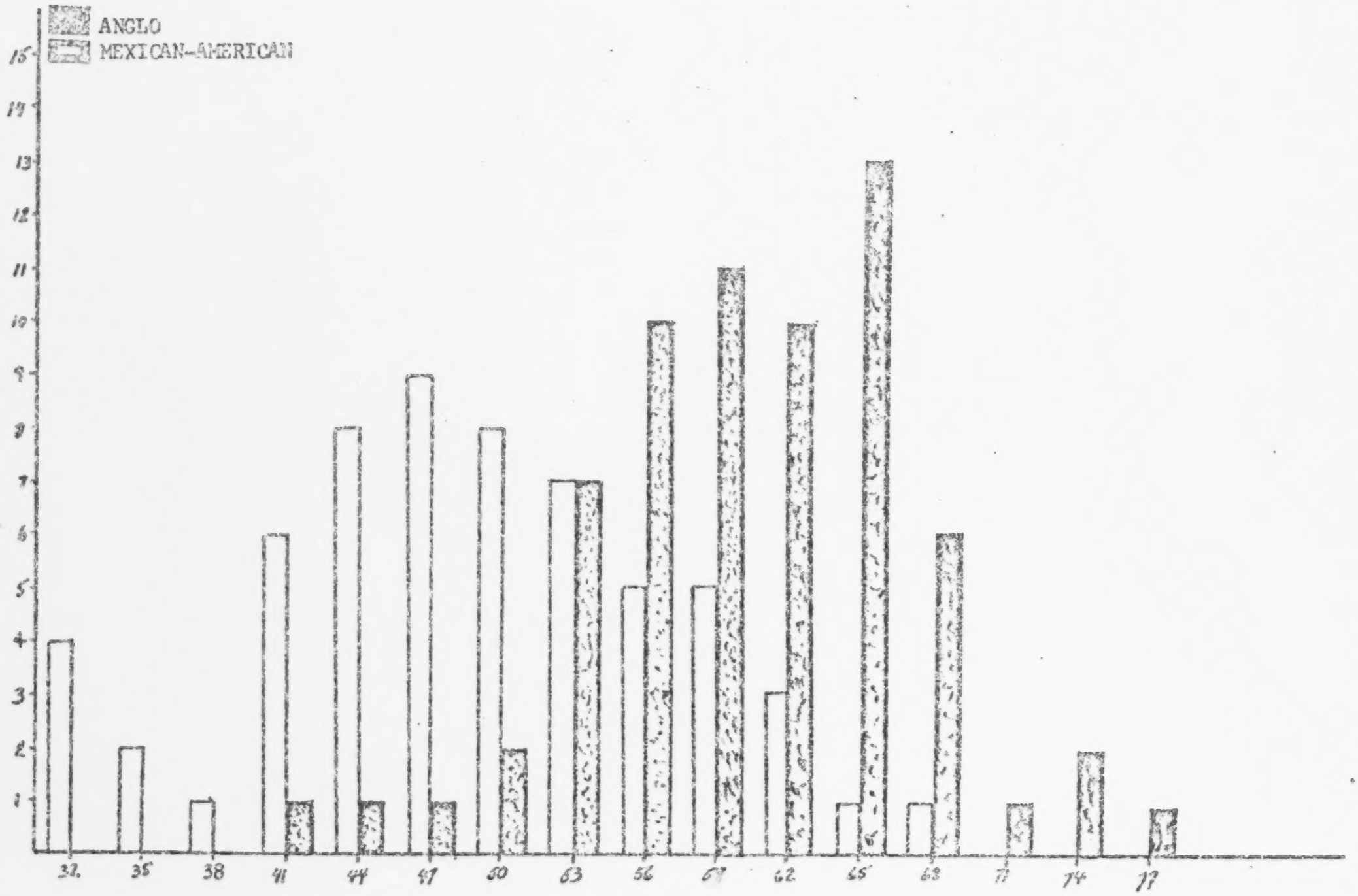

FIGURE 2

RAW SCORE DISTRIBUTION FOR ENVIRONMENTAL STIMULATION SCALE ON HELPS

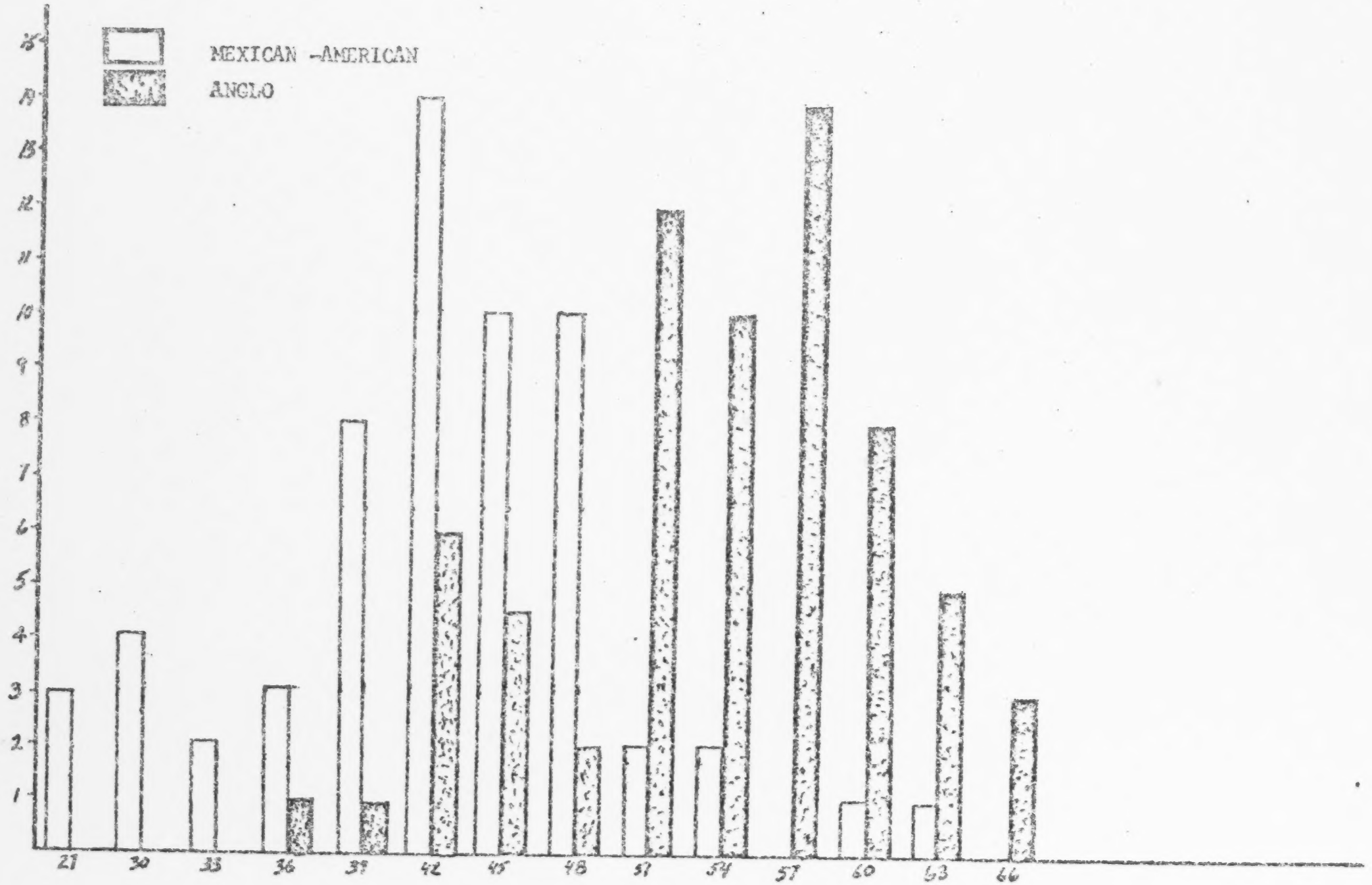

FIGURE 3

RAW SCORE DISTIBUTION FOR MODELS SCALE ON HELPS

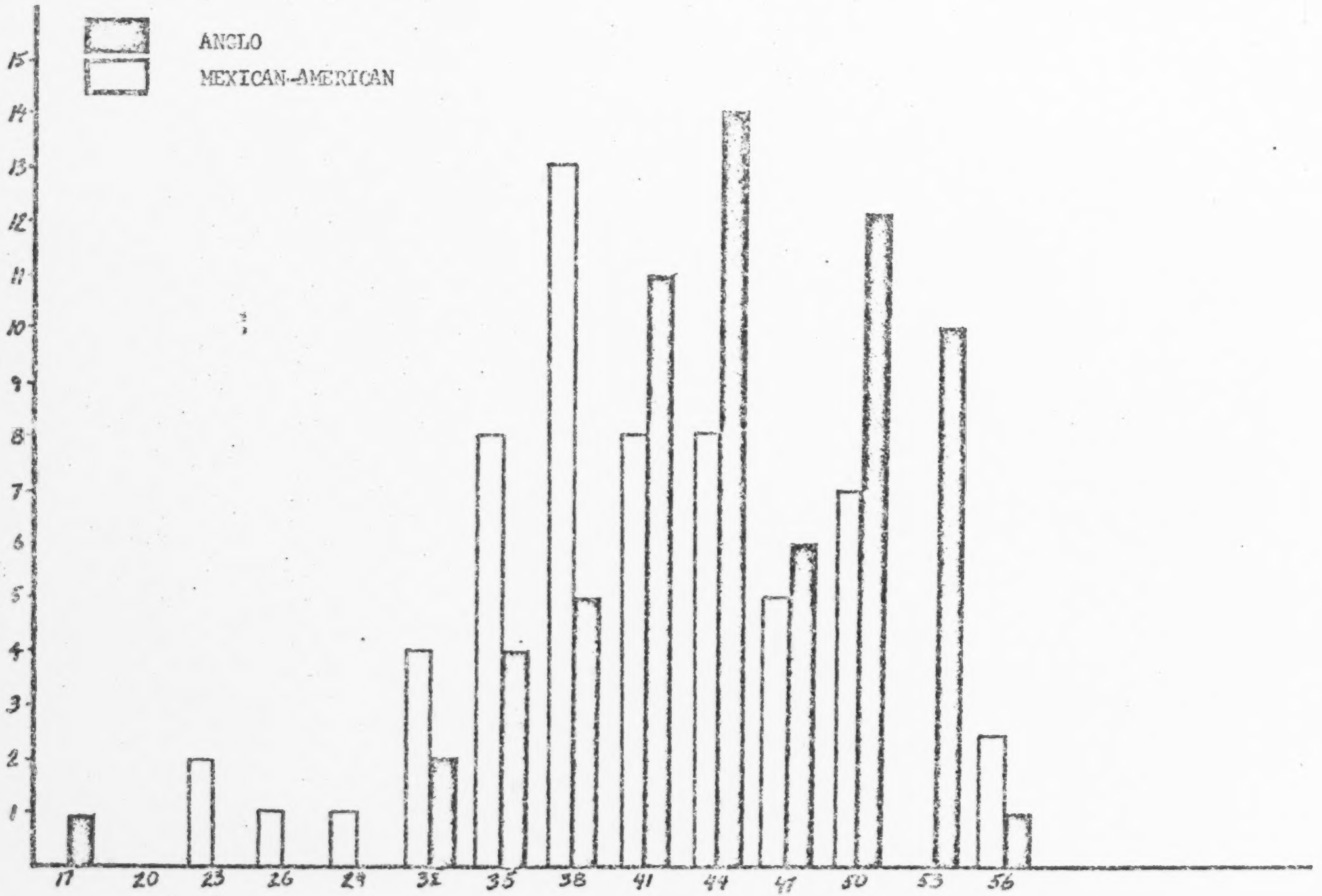

FIGURE 4

RAW SCORE DISTRIBUTION FOR PARENTAL GUIDANCE SCALE ON HELPS

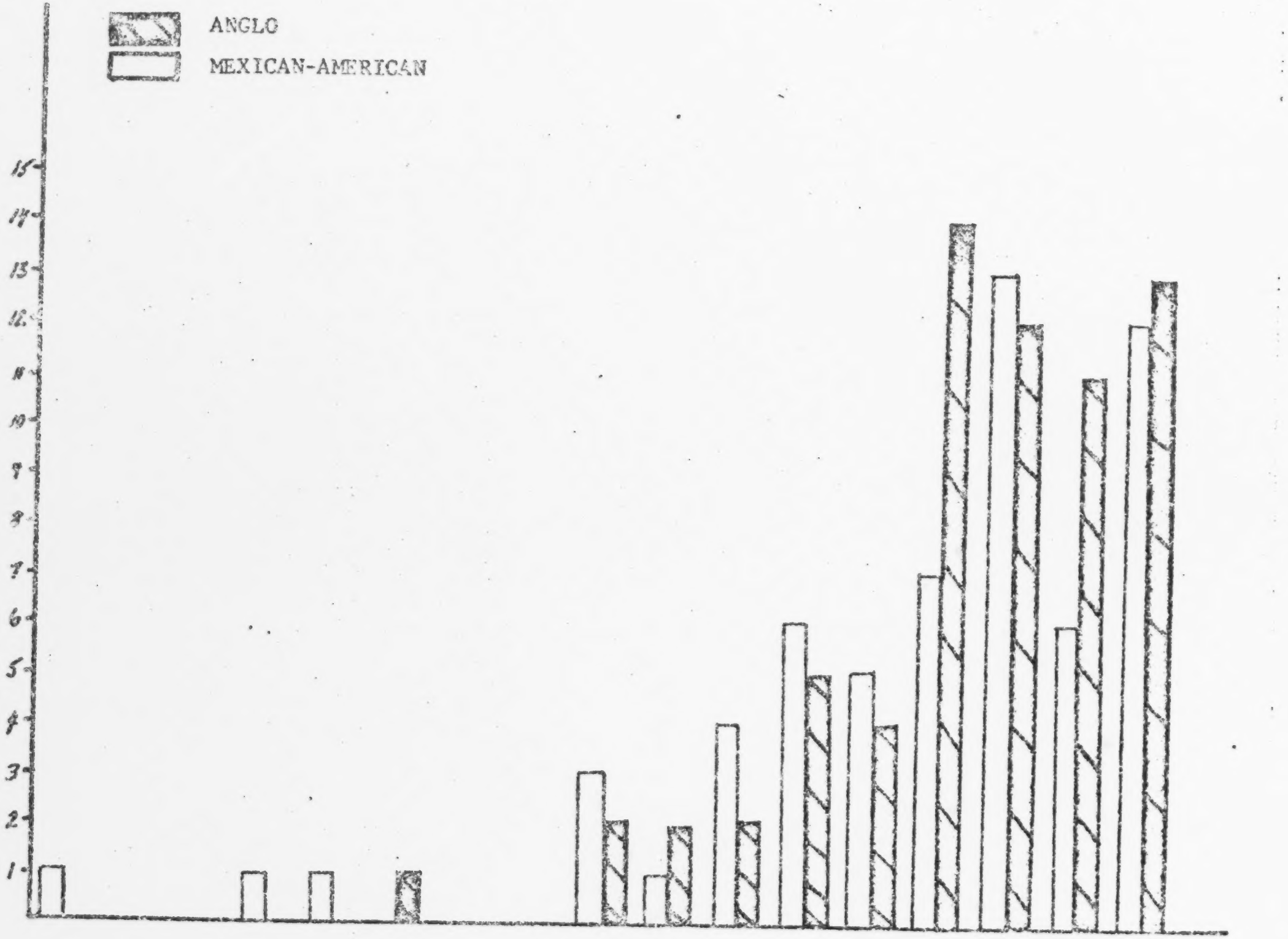

FIGURE 5

RAW SCORE DISTRIBUTION FOR

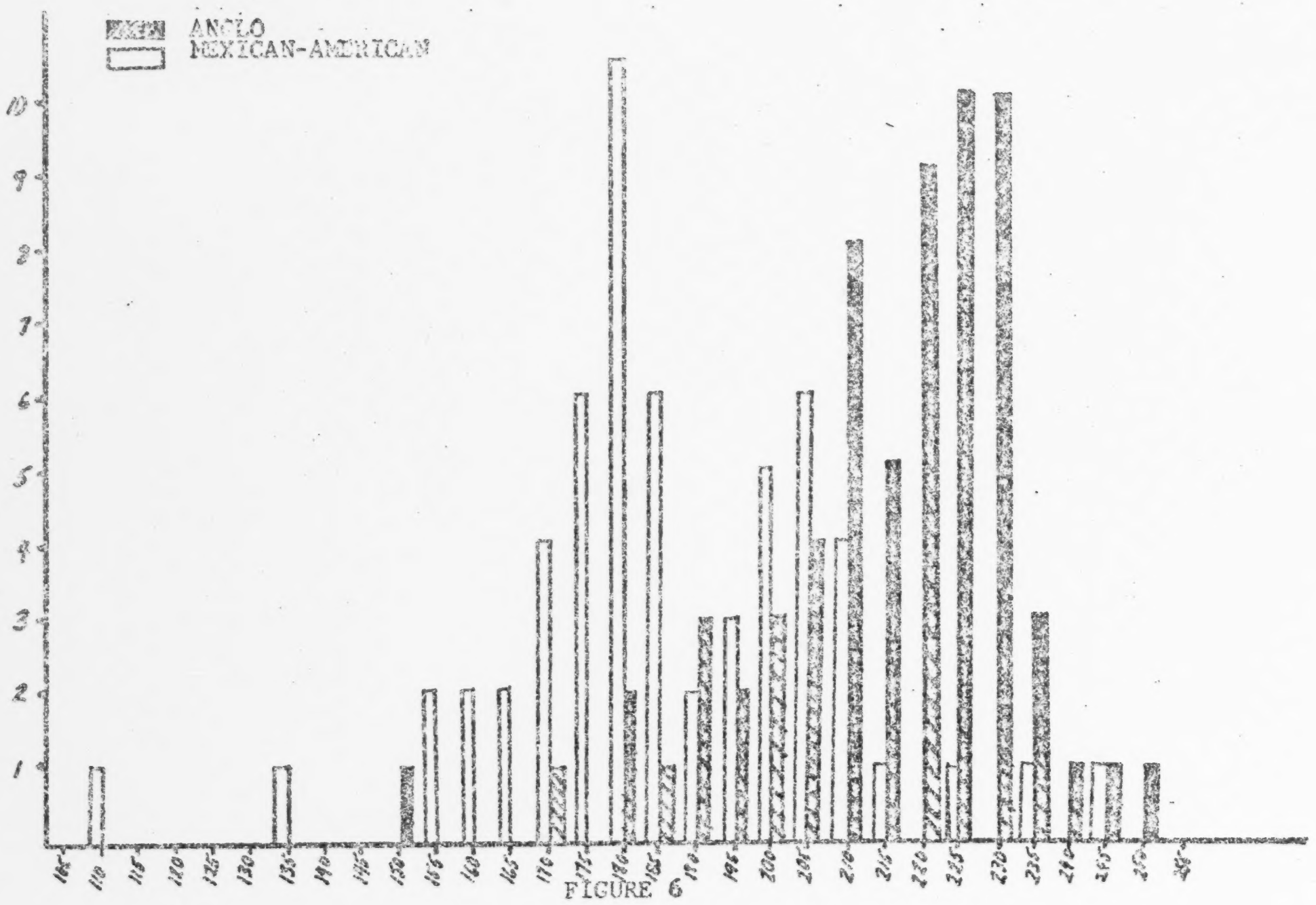

FIGURE 6

RAW SCORE DISTRIBUTION FOR TOTAL SCORE ON HELPS

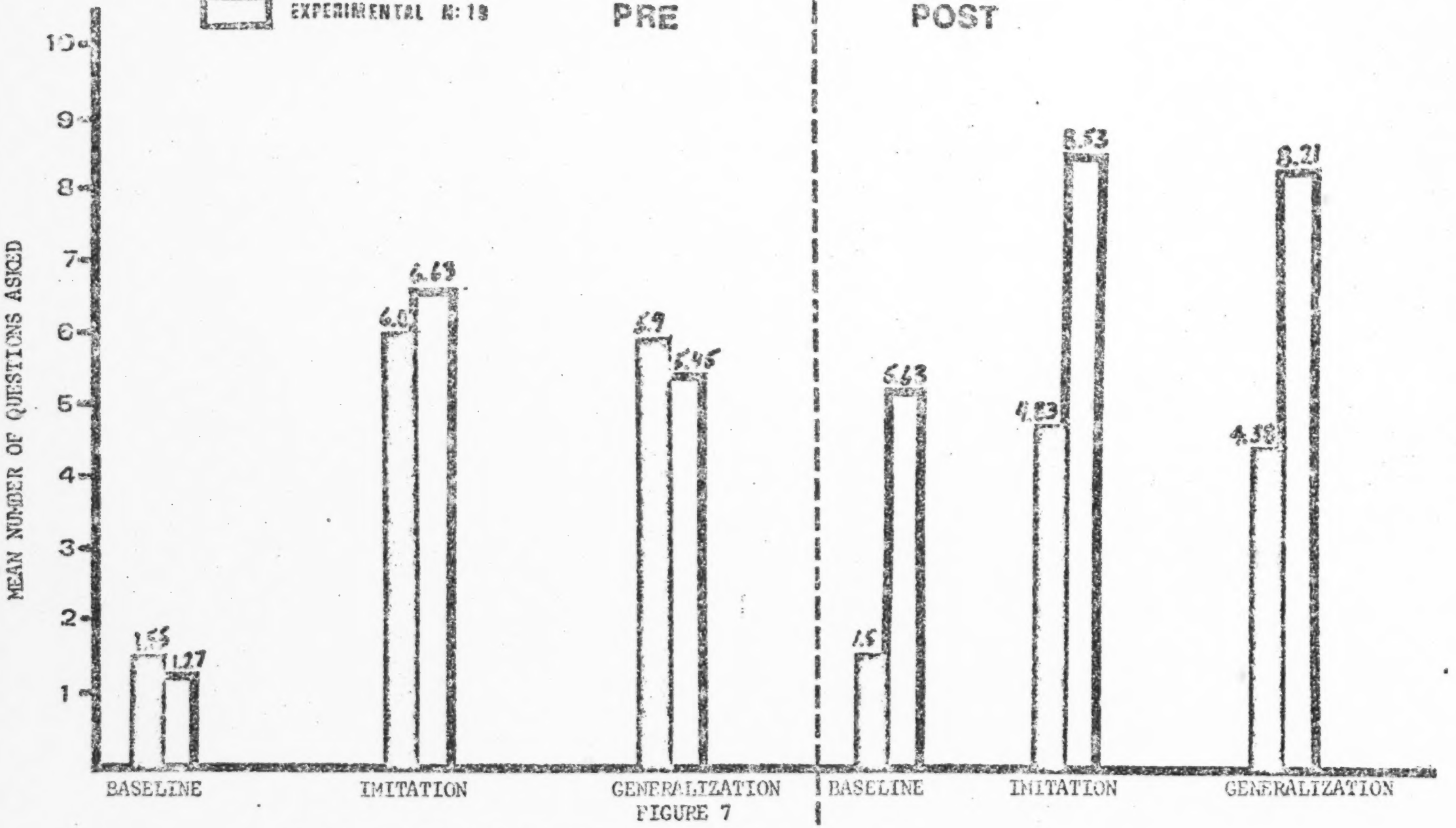

FIGURE 7

MEAN FREQUENCY OF QUESTIONS FOR PRE AND POST TESTING

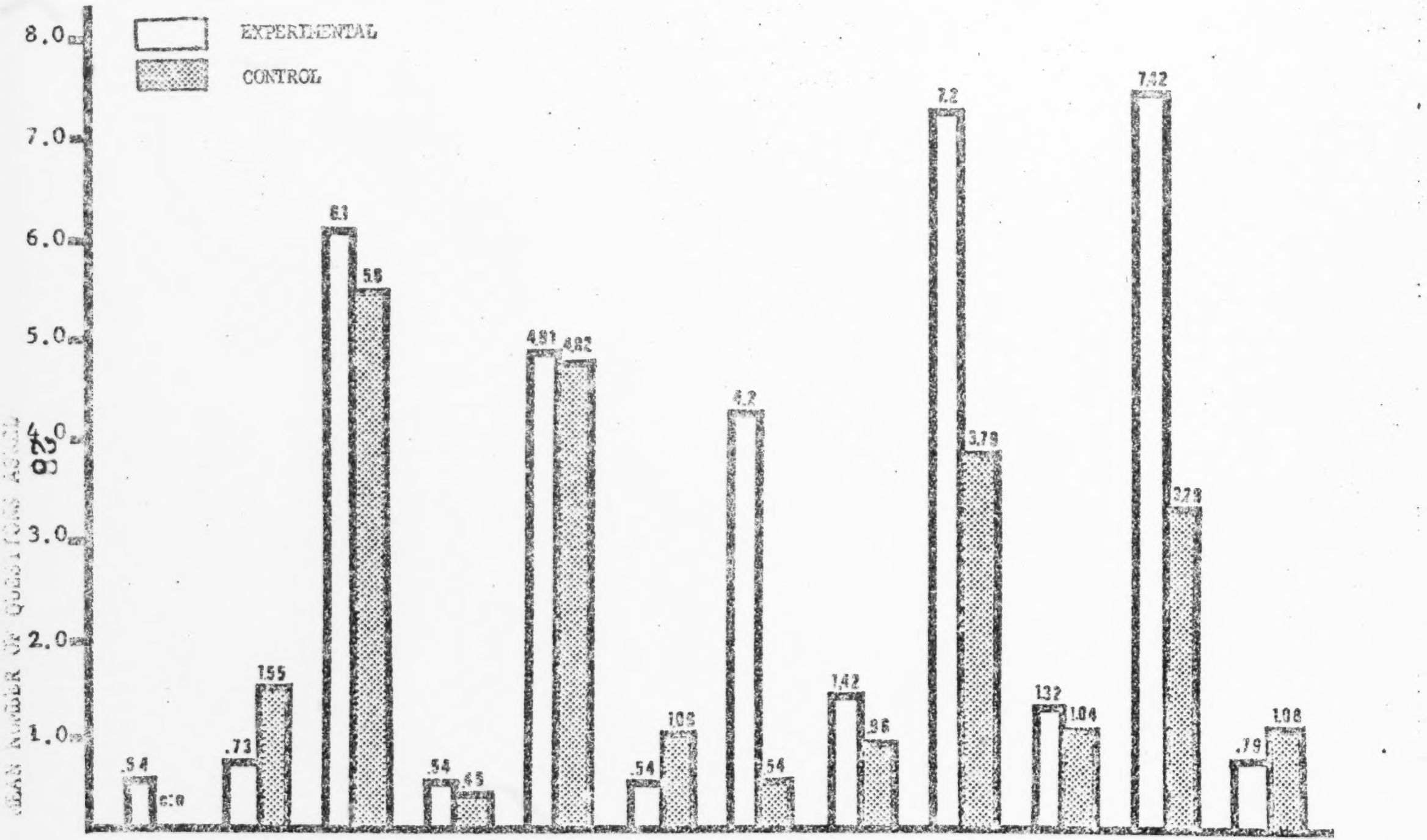

FIGURE 8

MEAN FREQUENCY OF QUESTIONS PER CATEGORY FOR PRE AND POST TESTING